

REMARKS

The Office Action has been carefully reviewed. In the Office Action, the Examiner rejected claims 1-10. Applicant has added claims 11 and 12, and has amended claims 1, 4, 6, 7, 9 and 10. Applicant respectfully requests reconsideration of this application in light of the remarks presented below.

I. Specification

A. Abstract

The Official Action objected to the Abstract for not being presented upon a separate sheet, apart from other text. Applicant has amended the specification to include the Abstract on a separate sheet which is attached hereto as Appendix A. Applicant respectfully requests the present objection be withdrawn.

B. Arrangement

The Official Action noted the arrangement of the specification "suggested" by 37 CFR 1.77(b). Applicant respectfully notes that the arrangement identified by 37 CFR 1.77(b) is merely a suggested arrangement and is not a "required" arrangement. Since the specification is in compliance with all "requirements," the Applicant elects to make no change to the specification at this time.

II. Claim Rejections Under 35 U.S.C. 112, Second Paragraph

The Official Action rejected claims 4, 6, 7, 9 and 10 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the Applicant regards as the invention. Applicant has amended claims 4, 6, 7, 9

and 10. Applicant respectfully requests the rejection of claims 4, 6, 7, 9 and 10 be withdrawn in light of the amendments and the below comments.

1. Claim 4

The Official Action indicated the limitation "it" in claim 4 has insufficient antecedent basis. Applicant has amended claim 4 by replacing the limitation "it" with the limitation "the cutting tool." Applicant respectfully requests the present rejection of claim 4 be withdrawn.

2. Claims 6, 7 and 9

The Official Action rejected claims 6, 7 and 9 for being indefinite. In particular, the Official Action identified limitations which the Examiner believed were unclear. Applicant has amended claims 6, 7 and 9 to further clarify the invention of such claims. Moreover, to further clarify the intent of claims 6, 7 and 9, the Applicant provides the following explanation.

Dependent claims 6, 7 and 9 define the amount of movement of the cutting tool which takes place along the cutting axis.

In claim 6, the incremental movement that is referred to is movement of the cutting tool along its axis (e.g. axis 8) rather than along the workpiece axis (e.g. axis 4). Claim 6 relates one of these incremental movements to the portion of the spherical surface that is cut while the cutting tool is in a particular position, between an n^{th} movement and an $(n+1)^{\text{th}}$ movement. Claim 6 defines this portion of the spherical surface in terms of the angle of arc, measured at the centre of the spherical surface.

Claim 7 is also directed to defining the portions of the spherical surface associated with incremental moves of the cutting tool, but further defines a maximum limit to the angle of arc of such portions.

Claim 9 is directed to defining the size of the approximately constant radius region at the pole of the spherical surface. In particular, claim 9 defines the size of the region using a cone half angle which is measured with reference to the centre of the sphere that is defined by the bearing surface.

In light of the above amendments and explanations, Applicant respectfully requests the present rejection of claims 6, 7 and 9 be withdrawn.

3. Claim 10

The Official Action listed claim 10 as being indefinite under 35 U.S.C. 112, second paragraph. However, the Official Action does not appear to provide any reasons why claim 10 is believed to be indefinite. Upon review of claim 10, Applicant believes the Official Action is rejecting claim 10 based upon the use of the limitation "it." Accordingly, Applicant has amended claim 10 by replacing the limitation "it" with the limitation "the component" to further clarify the antecedent. If claim 10 was rejected for other reasons, Applicant respectfully requests the Examiner to state with particularity why claim 10 is believed to be indefinite. Applicant respectfully requests the rejection of claim 10 be withdrawn.

III. Claim Rejections Under 35 U.S.C. 102(b) (Semlitsch)

The Office Action rejected claims 1-3, 5, 8 and 10 under 35 U.S.C. 102(b) as being anticipated by Semlitsch (U.S. 6,126,695). Applicant has amended claims 1 and 10. Applicant respectfully requests that the present rejection of claims 1-3, 5, 8 and 10 be withdrawn.

MPEP § 2131 provides that "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). "The identical invention must be shown in as complete detail as is

contained in the . . . claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Each of claims 1-3, 5, 8 and 10 requires moving the cutting tool (i) in a direction parallel to the polar axis of the component while leaving the angle between the axis of the cutting tool and the polar axis of the component unchanged, and (ii) along its axis and that such movements of the cutting tool cause the radius of curvature of the bearing surface to change continuously and monotonically as the angle between the radius and the polar axis of the component changes so that the shape of the bearing surface deviates from that of a true sphere. Thus, claims 1-3, 5, 8 and 10 require movement of the cutting tool to cause the shape of the bearing surface to deviate from that of a true sphere.

Semlitsch at column 4, lines 34-45 indicates that joint balls in FIGS. 2a and 2b are continued outside the bearing surface B by a quasi-spherical surface C. However, Semlitsch further indicates the lesser distance of the quasi-spherical surface C arises from the joint ball already being flattened off or conically formed with respect to the future center M_K in the region C prior to grinding. In other words, Semlitsch teaches that the quasi-spherical surface C is not formed by movement of the cutting tool but results from the formation of the joint ball prior to grinding. Thus, Semlitsch fails to teach movement of the cutting tool to cause the shape of a bearing surface to deviate from that of a true sphere as required by claims 1-3, 5, 8 and 10. Applicant therefore respectfully requests the present rejection of claims 1-3, 5, 8 and 10 be withdrawn.

IV. Claim Rejections Under 35 U.S.C. 102(b) (Wagenseil)

The Office Action rejected claims 1-3, 5 and 8 under 35 U.S.C. 102(b) as being anticipated by Wagenseil (U.S. 5,823,721). Applicant has amended claim 1. Applicant respectfully requests that the present rejection of claims 1-3, 5 and 8 be withdrawn.

Wagenseil discloses a method of making an undercut concave bearing surface. The bearing surface is spherical between the equator and the pole. The method involves some manipulation of the cutting tool when forming the undercut bearing surface, but this manipulation of the cutting tool is to enable a hollow spherical surface to be created having a radius R that is greater than the opening through which the cutting tool is introduced to the cavity. The movement along the cutting axis is performed between cutting the portions of the spherical surface above and below the equator, respectively. See, Wagenseil at column 4, lines 13-34. Wagenseil indicates the tool may be moved along the workpiece axis in order to adjust the relative positions of the centre points of the spherical surfaces, above and below the equator. It is important however to note that there is no variation in the radius on either side of the equator – the radii of the surface are constant in each of the two regions on opposite sides of the equator.

Wagenseil simply does not disclose a method to make a bearing surface having a varying radius between the equator and the pole as claimed by claims 1-3, 5 and 8. In contrast, the method of claims 1-3, 5 and 8 involves cutting the substrate and moving the tool, where the resulting cutting step is performed on the bearing surface between the equator and the polar region to provide for continuous and monotonic changes in radius over this particular portion of the bearing surface. This approach is different from what is disclosed in Wagenseil. Wagenseil specifically references changing the distance between the two spherical regions of different radius on opposite sides of the equator, so that they could be separated or could overlap. This

change in distance taught by Wagenseil inevitably involves introducing a discontinuity in the machined surface. A discontinuity in the machined surface is inconsistent with the requirement for a continuous and monotonic change in radius of curvature as specified in claim 1.

Applicant respectfully requests the present rejection of claims 1-3, 5 and 8 be withdrawn.

V. Claim Rejections Under 35 U.S.C. 102(b) (Smith)

The Office Action rejected claims 1-3 and 8 under 35 U.S.C. 102(b) as being anticipated by Smith (U.S. 3,212,405). Applicant has amended claim 1. Applicant respectfully requests that the present rejection of claims 1-3 and 8 be withdrawn.

Claim 1 requires moving the cutting tool along its axis. Smith, however, does not appear to teach moving the cutting tool along its axis 22. Smith only appears to teach moving the cutting tool along the work axis 16. As such, the method of cutting taught by Smith results in a spherical cavity having a constant radius. However, claim 1 requires movement of the cutting tool along its axis which results in the bearing surface having a shape that deviates from that of a true sphere. Smith simply does not teach a method of creating a bearing surface that deviates from that of a true sphere as Smith fails to teach moving the cutting tool along its axis 22.

Applicant respectfully requests the rejections of claims 1-3 and 8 be withdrawn

VI. Claim Rejections Under 35 U.S.C. 103(a) (Semlitsch, Wagenseil or Smith)

The Office Action rejected claim 4 as being unpatentable over Semlitsch, Wagenseil or Smith. Claim 4 includes claim 1 as a base claim and is therefore allowable for at least the reasons mentioned above in regard to claim 1. Applicant respectfully requests the present rejection be withdrawn.

VII. Claim Rejections Under 35 U.S.C. 103(a) (Semlitsch or Wagenseil)

The Office Action rejected claims 6, 7 and 9 as being unpatentable over Semlitsch, or Wagenseil. Each of claims 6, 7 and 9 includes claim 1 as a base claim and is therefore allowable for at least the reasons mentioned above in regard to claim 1. Applicant respectfully requests the present rejection be withdrawn.

CONCLUSION

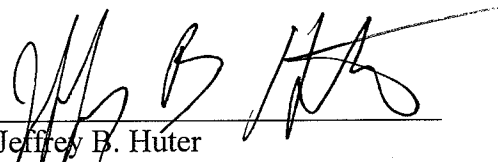
In view of the foregoing remarks, it is submitted that this application is in condition for allowance. Action to that end is hereby solicited.

Applicant respectfully requests an extension of time of two months or a time sufficient to effect a timely response to the Office Action dated December 21, 2007. Applicant further authorizes the Commissioner to debit/credit the account of Barnes & Thornburg, Deposit Account No. 10-0435 with reference to file 6320-75538 for the fee associated with the appropriate extension of time and any fees associated with the filing of the present response.

In the event that there are any questions related to this response in particular, or to the application in general, the undersigned would appreciate the opportunity to address those questions directly in a telephone interview to expedite the prosecution of this application for all concerned.

Respectfully submitted,

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